Factors affecting the functioning of patients after an implantation of a coronary artery bypass graft

(Czynniki wpływające na funkcjonowanie chorych po zabiegu wszczepienia pomostów aortalno-wieńcowych)

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Abstract – Introduction. In recent years, there has been rapid development of invasive cardiology and other methods of treatment of coronary heart disease, including coronary artery bypass grafting (CABG). CABG is currently the most frequently performed cardiac surgery in Poland; however, there are few up-to-date reports on the daily functioning of persons with a history of myocardial revascularization.

The aim of the study was to assess the factors affecting the functioning of patients after CABG.

Materials and methods. The study group consisted of 61 patients (70.5% were men) aged 48-81 (av. 65.3 ± 7.8) in a period of 2-6 months after CABG. The study used a questionnaire developed by the authors and the WHOQOL-BREF scale for the quality of life.

Results. The results in the somatic and psychological field decreased with age ($p<0.001$). Married patients achieved significantly better results than the persons living alone in the overall perception of the quality of life and in each of its fields ($p<0.05$). The higher the level of education of the respondents was, the better they perceived their health ($F=7.872$; $p=0.001$) and the higher scores they obtained in the somatic field ($F=6.119$; $p=0.004$). Active persons assessed the quality of their life and health better in all the areas of functioning ($p<0.05$).

Conclusions. The functioning of the patients after the surgery was dependent on age, marital status, family status, education, professional activity, the coexistence of other diseases with coronary artery disease, the duration of the surgery, and physical activity.

Key words **-** CABG, bio-psycho-social functioning, WHOQOL-BREF.

Streszczenie – Wstęp. W ostatnich latach obserwuje się dynamiczny rozwój kardiologii inwazyjnej i innych metod leczenia choroby niedokrwiennej serca, w tym pomostowania aortalno-wieńcowego (ang. Coronary artery bypass graft, CABG). CABG jest obecnie najczęściej przeprowadzanym zabiegiem kardiochirurgicznym w Polsce, jednak liczba aktualnych doniesień na temat codziennego funkcjonowania osób po przebytej rewaskularyzacji mięśnia sercowego jest niewielka.

Celem pracy była ocena czynników wpływających na funkcjonowanie chorych po CABG.

Materiał i metody. Grupę badaną stanowiło 61 chorych (70,5% mężczyzn) w przedziale wiekowym 48-81 lat (śr. 65,3 ± 7,8) w okresie 2-6 miesięcy po CABG. W badaniach zastosowano kwestionariusz wywiadu własnego autorstwa oraz skalę jakości życia WHOQOL-BREF.

Wyniki. Wraz z wiekiem obniżały się wyniki w dziedzinie somatycznej i psychologicznej ($p<0,001$). Chorzy pozostający w związkach małżeńskich osiągali znacznie lepsze wyniki niż osoby żyjące samotnie w zakresie ogólnej percepcji jakości życia oraz w poszczególnych jej dziedzinach ($p<0,05$). Im wyższy był poziom wykształcenia badanych, tym lepiej postrzegali oni własne zdrowie ($F=7,872$; $p=0,001$) oraz uzyskiwali wyższe wyniki w dziedzinie somatycznej ($F=6,119$; $p=0,004$). Osoby aktywne zawodowo znacznie lepiej oceniały jakość swojego życia i zdrowia oraz wszystkie dziedziny funkcjonowania ($p<0,05$).

Wnioski. Funkcjonowanie pacjentów po operacji było zależne od: wieku, stanu cywilnego, statusu rodzinnego, wykształcenia, aktywności zawodowej, współistnienia innych schorzeń z chorobą wieńcową, czasu od operacji oraz aktywności fizycznej.

Słowa kluczowe – CABG, funkcjonowanie bio-psycho-społeczne, WHOQOL-BREF

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I. INTRODUCTION

The ageing of the population and the increasing incidence of risk factors for coronary artery disease (CAD) such as type 2 diabetes, obesity, metabolic syndrome in increasingly younger people result in steady increase in the incidence of CAD worldwide [1]. CAD occurrence is closely related to lifestyle, in particular to smoking, unhealthy eating habits, low physical activity and psychosocial stress [2].

The consequences of coronary artery disease manifest themselves in the form of severe anxiety and depressive reactions or in the form of obvious changes in behaviour, with the domination of the increased tendency to give up or to limit one's life goals and objectives that are important for psychosocial functioning [3].

Despite the progress that has been made in recent years in cardiac surgery and interventional cardiology, the risk of death associated with cardiovascular disease continues to increase [4]. It is estimated that over 80% of all deaths due to diseases of the cardiovascular system occur in developing countries [5]. Coronary artery bypass grafting (CABG) is currently the most frequently performed cardiac surgery in Poland. An increasing number of heart surgeries is performed in patients over 75 years of age, who are under many burdens [6]. The primary objectives of surgical revascularization are: the extension of life, the elimination or reduction of symptoms associated with coronary artery disease, and the improvement of the quality of life [7].

Despite the expected benefits, CABG usually is an event of a psychological crisis with a very real and powerful sense that one's life is threatened. Reduced physical fitness during convalescence is associated with dependence on others and an occasional need for help even in simple everyday activities. Consequently, the perception of the social roles changes [8].

The return to full personal and professional activity after CABG involves many factors. In the literature, there are few reports on the daily functioning of patients (both before and after the surgery) that take into account the emotional experiences and well-being of patients. There is also a need for more publications on the factors affecting this functioning. The evaluation of the bio- psycho- social functioning of patients is the basis for the formulation of a nursing diagnosis and the development of an individual plan of care.

Aim of study

The aim of the study was to evaluate the factors affecting the functioning of patients after a coronary artery bypass grafting surgery.

II. MATERIAL AND METHODS

The study group consisted of 61 patients: 18 women (29.5%) and 43 men (70.5%) in the age from 48 to 81 (av. 65.3 ± 7.8 years), shortly after CABG (2-6 months), who were under the care of the Cardiology and Cardiac Surgery Consultation Specialist Clinic in the John Paul II Hospital in Krakow. The study was conducted during the period from September 2012 to January 2013. The patients with whom one could not make proper contact were excluded from the study. The respondents were briefed on the purpose of the study and informed that the participation is anonymous and voluntary. Relevant tests had been preceded by a pilot study, the results of which were included in the analysis.

The following research tools were used in the study:

- an authorial survey questionnaire including, among others, the information about the disease, treatment and health behaviours as well as socio-demographic data,
- a reduced World Health Organization Quality of Life WHOQOL-BREF scale in the Polish adaptation by Jaracz and Wołowicka (under the authors' consent).

The first two items of the WHOQOL-BREF scale were analyzed separately, i.e.: the question about the overall perception of the individual quality of life of the subjects and the general health perception. The remaining 24 questions enabled to identify the profile of the quality of life in four fields: physical, psychological, social and environmental. The scoring range of individual questions was from 1 to 5. A higher number of points obtained in the evaluation of the individual quality of life, the self-assessment of health status, as well as the results of the various fields meant better quality of life of the patients [9].

The results were processed using the R software (version 2.15.2) and an Excel spreadsheet. In the assessment of the differences between the groups in terms of relevant quantitative and qualitative variables a t-Student test and a Chi2 test was used, respectively. The comparison of mean values of the quantitative variables between the

groups was performed using an independent t-Student test and the analysis of variance (ANOVA). The results for which the significance level was lower than or equal to 0.05 were assumed to be statistically significant.

III. RESULTS

The youngest respondent was 48 and the oldest 81 years old (av. 65.3 ± 78 years). The average was 60.9 years for women and 67.1 years for men. The largest group was constituted of rural residents (54.1%), the majority of whom (75.4%) were married. The majority of the respondents had secondary education (47.5%) and the main source of the respondents' income was pension (37.7%).

Forty-four patients (72.1%) lived with wife or husband, 22 (36.1%) with children, 8 (13.1%) lived alone, 2 respondents (3.3%) with a partner, and 1 person with parents (the percentages do not add up to 100% because it was a multiple-choice question).

Before the surgery, 24 patients worked professionally (39.3%), while after CABG, only 10 persons returned to work (16.4%). The source of income for the most of the respondents both before and after the surgery was pension (37.7% and 41.0%, respectively). In addition, the percentage of people receiving disability allowances significantly increased after the treatment – from 23.0% to 41.0%. It is observed that the patients who were manual workers previously were less likely to return to work. Detailed data on the source of income of the respondents are shown in Figure 1.

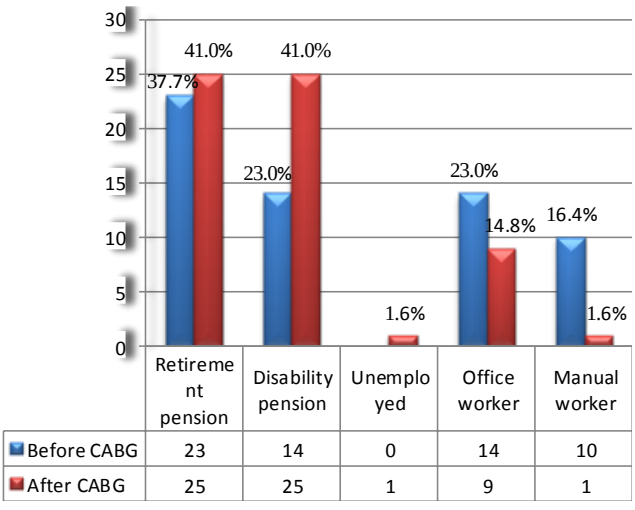

Figure 1. Professional status of the respondents before and after the surgery

There was no significant relationship between the professional status of the patients after the surgery and their education (Chi^2=4.898; p=0.086), probably due to a small number of working people before the surgery (n=24).

The duration of the treatment of coronary heart disease ranged from six months to 30 years (av. 7.4 ± 6.4 years). The analysis of the data shows that 19 out of 61 respondents (31.2%) had been treated for less than 2 years, 15 patients (24.6%) had been treated from 6 to 10 years, and 15 patients (24.6%) were treated for more than 10 years, whereas in the case of the remaining 12 patients (19.7%), the duration of the treatment was 3-5 years. Since the coronary artery bypass graft, an average of 4.02 ± 1.4 months had elapsed. This time ranged from 2 to 6 months. Twenty-five patients (41.0%) had had the surgery 4-5 months before the survey, 23 (37.7%) up to three months, and in case of 13 patients (21.3%), more than five months had passed since the surgery.

The occurrence of comorbidities in subjects was also analysed. As many as 42 patients (68.9%) reported a history of lipid disorders, 35 patients (57.4%) mentioned hypertension, and 19 respondents (31,2%) – diabetes. The number of comorbidities ranged from 1 to 5. More than a half, i.e. 34 persons (55.7%),mentioned two diseases, 18 patients (29.5%) suffered from one disease, while the remaining 9 patients (14.8%) had more than three diseases.

More than a half of the respondents (n=33; 54.1%) declared various forms of physical activity, 25 persons answered that they were not always active (41.0%), while the other 3 persons (4.9%) reported that they were not physically active at all.

All the respondents said that currently they did not smoke cigarettes, but a large group of them admitted to smoking in the past (n=42; 68.9%). Only 19 patients (31.2%) had never smoked. The moment in which patients had given up smoking ranged from several years to a week before the surgery, or even a day before the surgery. It is worth noting that 7 persons had smoked their last cigarette on the day of the surgery (11.5%).

Regarding the questions on the overall perception of the quality of life and health, 26 patients (42.6%) answered that they were satisfied with the quality of their life. Twenty patients (32.8%) were satisfied with their health, and slightly more were moderately satisfied (n=25; 41.0%). The surveyed patients were slightly more satisfied with the quality of their life than with the state of health (av. 3.5 ± 0.8 vs. 3.4 ± 0.9).

Then, the respondents were asked to assess the quality of their life in four fields: physical, psychological, social and environmental. The patients assessed best the psychological field (av. 15.2 ± 3.4), followed by the social

(av. 14.8 ± 3.5), environmental (av. 14.0 ± 4.5), and somatic (av. 13.9 ± 3.9) fields.

Subsequently, the relationship between selected factors and the quality of life of the patients was analysed. Such factors as age, sex, marital status, place of residence, education, economic activity, the coexistence of other diseases, the duration of the surgery, the duration of coronary artery disease, physical activity, family status, and smoking were taken into account.

It was disclosed that the results in the somatic and psychological area decreased with age ($p<0,001$). Individual overall perception of the quality of life and one's own health was rated highest by the patients aged 61-70 (av. 3.7 ± 0.8) and the lowest by those over 70 years of age (av. 2.9 ± 0.8) ($p<0.05$).

It was shown that women assessed the overall quality of life slightly better than men, and they also obtained a higher level of the quality of life in specific fields (except for the social field). These differences were not statistically significant ($p> 0.05$).

Due to a small number of unmarried and divorced patients, they were combined into one sub-group of widows and widowers. It was found that married patients achieved significantly better results than people living alone in the overall perception of the quality of life and in each of its fields ($p<0.05$ for the perception of their health, $p\leq0.001$ for other variables, cf. Table 1).

Table 1.The quality of life of the patients and their marital status

WHOQOL-BREF field	Marital status	Score		t-Student test
		average	± SD	
Perception of quality of life	Married	3.7	0.8	t=4.081 p<0.001
	Other patients	2.8	0.7	
Perception of one's health	Married	3.5	0.9	t=2.131 p=0.037
	Other patients	3.0	0.7	
Somatic field	Married	14.6	2.3	t=3.836 p<0.001
	Other patients	11.9	2.4	
Psychological field	Married	15.7	1.6	t=4.521 p<0.001
	Other patients	13.5	1.9	
Social field	Married	14.6	2.3	t=3.609 p=0.001
	Other patients	12.1	2.3	
Environmental field	Married	15.3	2.1	t=3.55 p=0.001
	Other patients	13.2	1.6	

There was no correlation between the quality of life and the place of residence of the subjects ($p>0.05$). Due to a small number of respondents with primary education, they were analyzed together with the patients with vocational education. It was observed that the higher the level of education of the respondents was, the better they perceived their health ($F=7.872$; $p=0.001$) and the higher scores they obtained in the somatic field ($F=6.119$; $p=0.004$). The active persons assessed better the quality of their life and health and all the areas of functioning ($p<0.05$, Table 2).

Table 2. The quality of life of the respondents and their professional activity

WHOQOL-BREF field	Professional activity	Score		t-Student test
		average	± SD	
Perception of the quality of life	Professionally active	4.4	0.5	t=4.176 p<0.001
	Professionally inactive	3.3	0.8	
Perception of one's health	Professionally active	4.5	0.5	t=5.077 p<0.001
	Professionally inactive	3.2	0.8	
Somatic field	Professionally active	17.0	0.7	t=4.902 p<0.001
	Professionally inactive	13.3	2.4	
Psychological field	Professionally active	16.8	0.9	t=3.076 p=0.003
	Professionally inactive	14.9	1.9	
Social field	Professionally active	16.3	1.3	t=3.549 p=0.001
	Professionally inactive	13.5	2.4	
Environmental field	Professionally active	16.7	2.0	t=3.349 p=0.001
	Professionally inactive	14.4	2.0	

It was also disclosed that the patients with one disease perceived the quality of their life better than the other patients did ($p<0.05$). In addition, it was observed that a greater number of diseases was associated with worse assessment of one's health and lower quality of life in the social field ($p<0.05$, Table 3).

Table 3.The quality of life of the respondents and the coexistence of other diseases

WHOQOL-BREF field	Comorbidities	Score		ANOVA
		average	± SD	
Perception of the quality of life	One disease	4	0.8	F=4.328 p=0.018
	2-3diseases	3.3	0.7	
	More than 3 diseases	3.3	0.9	
Perception of one's health	One disease	3.9	1.0	F=3.247 p=0.046
	2-3diseases	3.3	0.8	
	More than 3 diseases	3.2	0.8	
Somatic field	One disease	14.8	2.5	F=1.691 p=0.193
	2-3diseases	13.9	2.1	
	More than 3 diseases	13.2	3.2	
Psychological field	One disease	15.9	1.7	F=1.685 p=0.194
	2-3diseases	14.9	1.8	
	More than 3 diseases	14.9	2.3	
Social field	One disease	15.4	2.0	F=4.655 p=0.013
	2-3diseases	13.8	2.4	
	More than 3 diseases	12.9	2.5	
Environmental field	One disease	15.4	2.0	F=1.06 p=0.353
	2-3diseases	14.5	1.9	
	More than 3 diseases	14.6	2.6	

The patients up to 3 months after the surgery were characterized by poor quality of life in the somatic field, as compared to the other patients (F=6.06; p=0.004). However, there were no correlations between the quality of life and the duration of coronary heart disease (p>0.05). The patients who declared that they were physically active had higher quality of life in the somatic (p<0.001) and the environmental field (p<0.05) than the patients defining themselves as inactive and not always active.

On the basis of the analysis of the data, it was demonstrated that the persons who live alone obtained significantly lower scores in each field and had worse overall quality of life than those living with someone (p<0.05). There was no correlation between the family status and the perception of one's health (p>0.05, Table 4).

Table 4.The quality of life and the family status

WHOQOL-BREF field	Residence	Score		t-Student test
		average	± SD	
Perception of the quality of life	Living with others	3.6	0.8	t=3.352 p=0.001
	Living alone	2.6	0.7	
Perception of one's health	Living with others	3.5	0.9	t=1.877 p=0.066
	Living alone	2.9	0.8	
Somatic field	Living with others	14.3	2.3	t=3.248 p=0.002
	Living alone	11.4	2.7	
Psychological field	Living with others	15.5	1.7	t=4.026 p<0.001
	Living alone	12.9	2.0	
Social field	Living with others	14.4	2.2	t=3.853 p< 0.001
	Living alone	11.1	2.5	
Environmental field	Living with others	15.2	2.0	t=3.958 p<0.001
	Living alone	12.3	1.6	

There was also no significant association between the quality of life and smoking until the surgery (p>0.05). The greatest disparity between the smokers and the non-smokers has been demonstrated in the field of psychological assessment, with the lower score in the group of smokers (p=0.055).

IV. DISCUSSION

This study has presented the functioning of the patients after a coronary artery bypass grafting surgery as well as an analysis of the factors affecting this functioning. The authors sought to determine how the CABG patients assessed their lives, both on the somatic and psychosocial level.

A positive result obtained from the analysis of the own research is the fact that all the respondents ceased smoking after the surgery, although as much as 68.9% of them had a history of smoking and 11.5% smoked until the day of the surgery. Similar data have been obtained by Suwalski et al. [10]. They noted complete cessation of smoking in the case of 28% of the respondents who had smoked until the day of the surgery. These results confirm the high motivation to improve and maintain one's quality of life, which is dependent on the overall reduction of risk factors. It should be noted, however, that the data were based on the

statements of the respondents and perhaps not all of them admitted to smoking.

Before the surgery, 39.3% of the patients (24 persons) worked professionally, 41.7% of whom returned to professional activity (10 persons), which constituted 16.4% of all the respondents. According to Salabura et al., a higher proportion of patients after acute myocardial infarction treated by angioplasty, i.e. 60%, planned to return to work and the quality of their life was better than in the case of the retired individuals [11]. Our study has confirmed these findings, as the professionally active patients obtained a higher quality of life score in each of the fields of functioning, as compared with the professionally inactive patients.

The data presented by Zwoliński et al. disclose that the percentage of patients returning to work is higher among better educated persons. In the group of women with secondary and higher education, 20% of the respondents did not continue to work, while among the respondents with primary education, as many as 77% of them stopped working [12]. The analysis of the own research displayed a similar trend – none of the patients with primary or vocational education continued to work after the surgery, while among those with secondary and higher education, 52,4% stopped working. These differences were not statistically significant due to a small size of the studied group.

The decrease in the percentage of working people may be related to the overall economic situation in the country. In addition, there is a belief among employers that people who have undergone a heart surgery are not able to work, and because of the fear of sick leaves, they are reluctant to employ them. Before the surgery, 23% of the respondents had received disability pension, while after the surgery the pension was received by 41% of the subjects. In the research by Zwoliński, the percentage of disability allowances after the surgery increased from 40% up to 81% [12]; it should be emphasized that this analysis involved young women, while in our study, a significant portion of the respondents were of retirement age.

Salabura et al., in a study on the quality of life of patients after a myocardial infarction treated with angioplasty in 3 and 6 months after the surgery, showed that the quality of life deteriorated with age [11]. Similarly, in the own research, it was demonstrated that the quality of life in the somatic and psychological fields decreased with age. In addition, the oldest patients assessed the overall perception of their lives on a lower level. A detailed comparison is not possible because of differences in the methodology of research – the above-mentioned team studied the quality of life on the basis of a MOS Health Survey SF-36 questionnaire.

Najafi et al. [13] demonstrated that women with CAD awaiting CABG obtained worse results in each of the fields of the quality of life, as compared to men. The own research, on the other hand, shows that women in the period of up to six months after the surgery assess the quality of life in the respective fields a little better (except for the social field), but these results were not statistically significant.

Kurowska and Korecińska [14], in a study on the impact of health behaviours on the quality of life of patients before a cardiac surgery, observed a relationship between marital status and the social field of the quality of life. The highest level in this field was noticeable in the case of married people. The results of the study described this paper indicate that after the surgery, married people obtained better results in each of the fields of functioning.

Education was the differentiating factor in the somatic field (the higher the level of education, the higher the level of the quality of life in this field). In the study of Kurowska and Korecińska [14], a similar trend occurred both in the somatic and the psychological field. Iranian authors have also demonstrated a correlation between low levels of education and poorer quality of life in the physical field [13].

V. CONCLUSIONS

- The professionally active patients, married and living with their families after the CABG surgery functioned better in each of the fields and assessed the overall quality of life better than the non-employed and lonely persons.
- The respondents with one comorbidity with CAD perceived the overall quality of life better than the patients with several diseases.
- The persons who were older, less educated, less physically active, and those in the period of up to 3 months after the surgery assessed their functioning in the somatic field on a lower level. The elderly patients also obtained lower scores in the psychological field, and the physically inactive patients – in the environmental field.

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